UNITED STATES
AIR FORCE

OCCUPATIONAL SURVEY REPORT

UTILITIES SYSTEMS

AFSC 3E4X1

AFPT 90-3E4-027

FEBRUARY 1996

OCCUPATIONAL ANALYSIS PROGRAM
AIR FORCE OCCUPATIONAL MEASUREMENT SQUADRON
AIR EDUCATION and TRAINING COMMAND
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PREFACE

This report presents the results of an Air Force occupational survey of the AFSC 3E4X1 Utilities System career ladder. Authority for conducting occupational surveys is contained in AFI 36-2623. Computer products used in this report are available for use by operations and training officials.

CMSgt David G. McDaniel, Inventory Development Specialist, developed the survey instrument; Mrs. Joan St. John, Occupational Analyst, analyzed the data and wrote the final report. Mr. Wayne Fruge provided computer programming support, and Mr. Richard Ramos provided administrative support.

Copies of this report are distributed to Air Staff sections, major commands, and other interested training and management personnel. Additional copies are available upon request to the Air Force Occupational Measurement Squadron, Attention: Chief, Occupational Analysis Flight (OMY), 1550 5th Street East, Randolph AFB, Texas 78150-4449 (DSN 487-6623).

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SUMMARY OF RESULTS

1. *Survey Coverage*: The Utilities System (AFSC 3E4X1) career ladder was surveyed to obtain current job and task data for use in updating career ladder training documents and the technical school training program. Survey results are based on data collected from 1,192 AFSC 3E4X1 personnel. This represents 63 percent of the total assigned population.

2. *Specialty Jobs*: Structure analysis of the AFSC 3E4X1 data identified two clusters and eight independent jobs (IJ): Fire Suppression, Plumbing Installation, Plumbing Cluster, Swimming Pool Maintenance Cluster, Wastewater Systems Operations, Supervision, Field Water Purification Plant Operations, Water Systems Operations, Hazardous Waste and Training. These clusters and IJs are discussed within this report.

3. *Career Ladder Progression*: Normal career ladder progression within the AFSC 3E4X1 career ladder is evident. Three-skill level personnel spend the vast majority of their job time performing technical tasks involving plumbing activities (59 percent), and 15 percent performing environmental support activities. At the 5-skill level, personnel are still involved in plumbing and environmental support activities, but begin to become involved with supervisory activities. Seven-skill level personnel reflect a greater shift toward supervisory and management work, although they are still involved with performing technical tasks. AFMAN 36-2108 *Specialty Description* provides a broad and generally accurate description of the technical and supervisory functions performed within the career ladder.

4. *Training* Analysis: First-enlistment members spend approximately 96 percent of their duty time devoted to technical and administrative or supply functions. The Draft Specialty Training Standard (STS) is supported by survey data. Subject-matter experts, however, should carefully review the STS for possible fine-tuning of content and proficiency codes.

5. *Job Satisfaction Analysis*: In general, job satisfaction among AFSC 3E4X1 personnel is fairly high, with no serious satisfaction problems noted. Overall, personnel working in the Field Water Purification Plant Operations job had the lowest job satisfaction.

6. *Implications*: The AFSC 3E4X1 career ladder structure identified in this report is similar to that found in the 1987 Plumbing OSR, and the 1985 Environmental Support OSR. The AFMAN 36-2108 *Specialty Description* accurately describes the jobs and tasks being performed. Job satisfaction is fairly high among career ladder incumbents. The Draft STS provides comprehensive coverage of tasks performed by career ladder personnel across 10 jobs. Overall satisfaction was positive for the jobs identified.

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OCCUPATIONAL SURVEY REPORT (OSR)
UTILITIES SYSTEM CAREER LADDER
(AFSC 3E4X1)

INTRODUCTION

This is a report of an occupational survey of the Utilities System career ladder conducted by the Occupational Analysis Flight, Air Force Occupational Measurement Squadron. The survey was conducted to obtain current job and task data. In October 1992, the 552X5 (Plumbing), and the 566X1 (Environmental Support) merged to form the present 3E4X1 Utilities System career field. Data collected through this OSR will be utilized by training development personnel to review courses and related training documents in light of equipment and utilization changes which have occurred since the last Plumbing OSR in 1987 and the Environmental Support OSR in 1985.

Background

As described in the AFMAN 36-2108 *Specialty Description* for AFSC 3E4X1, dated 31 October 1994, members are responsible for installing and operating water, wastewater, and gas distribution systems and components. They maintain, inspect, and repair water, wastewater, and gas distribution systems and components. They advise on problems installing and repairing of Utilities equipment and systems. They perform planning activities and facility surveys.

Initial 3-skill level training for AFSC 3E4X1 personnel is currently provided through a 47-day course (J3ABR3E431 003) at Sheppard AFB TX. This course includes an introduction to water processing; water analysis; operating principles of water treatment plants; maintenance of water and wastewater processing system components; operating principles, configuration, construction, maintenance, and repair of water supply systems, waste systems, and natural gas systems. It also includes installing fixtures; faucets; valves; appurtenances; use and maintenance of tools and equipment; installation and removal of backflow prevention devices; and training on contingency.

Entry into the career ladder currently requires Armed Forces Vocational Aptitude Battery minimum score of 51 Mechanical, and strength factor of J (60 lbs).

SURVEY METHODOLOGY

Inventory Development

The data collection instrument for this occupational survey was USAF Job Inventory (JI) AFPT 90-3E4-027, dated May 1994. The Inventory Developer prepared a tentative task list by reviewing pertinent career ladder publications, directives, and the previous JIs and OSRs. This task list was further refined and validated through personal interviews with 40 subject-matter experts representing a variety of major commands (MAJCOMs) at the following locations:

BASE	UNIT VISITED
Sheppard AFB TX	363 TCHTS
Peterson AFB CO	21 CES
Falcon AFB CO	50 CES
USAF Academy CO	54 CES
Cheyenne Mountain AS CO	721 CES
Eglin AFB FL	646 CES
Hurlburt Fld FL	823 RHCES
Kelly AFB TX	651 CES

The resulting JI contained a comprehensive listing of 1,210 tasks grouped under 22 duty headings with a background section requesting such information as grade, MAJCOM, job title, time in present job, time in service, job satisfaction, functional area, organizational level, work schedule, water source, wastewater system, equipment and forms used.

Survey Administration

Base training offices at operational bases worldwide administered the inventory to 1,689 DAFSC 3E4X1 personnel holding a 3-, 5-, or 7-skill level. Personnel excluded from taking the survey comprised the following: (1) hospitalized personnel; (2) personnel in transition for a permanent change of station; (3) personnel retiring during the time inventories were administered

to the field; and (4) personnel in their job less than 6 weeks. Participants were selected from a computer-generated mailing list obtained from personnel data tapes maintained by the Air Force Personnel Center.

Each individual who completed the inventory first filled in an identification and biographical information section and then checked each task performed in the member's current job. After checking all tasks performed, respondents then rated each task on a 9-point scale showing relative time spent on that task, as compared to all other tasks checked. The ratings ranged from 1 (very small amount time spent) through 5 (about average time spent) to 9 (very large amount spent).

To determine relative time spent for each task checked by a respondent, all of the incumbent's ratings are assumed to account for 100 percent of the member's time spent on the job. First, the ratings are summed. Each task rating is then divided by the sum of task ratings and multiplied by 100 to provide a relative percentage of time for each task. This procedure provides a basis for comparing tasks in terms of both percent members performing and average percent time spent.

Survey Sample

The final AFSC 3E4X1 survey sample includes responses from 1,192 job incumbents. Table 1 reflects the distribution, by MAJCOM, of assigned AFSC 3E4X1 personnel as of July 1993. The 1,192 respondents in the final sample represent 63 percent of all assigned AFSC 3E4X1 personnel. Table 2 reflects the distribution by paygrade. These figures show the sample is representative of the total enlisted population.

Task Factor Administration

Job descriptions alone do not provide sufficient data for making decisions about career ladder documents or training programs. Task factor information is needed for a complete analysis of the career ladder. To obtain the needed task factor data, selected senior AFSC 3E4X1 personnel (generally E-6 or E-7 craftsmen) also completed a second booklet for either training emphasis (TE) or task difficulty (TD). These booklets were processed separately from the JIs. This information is used in a number of different analyses discussed in more detail within the report.

Task Difficulty (TD). Task difficulty is defined as an estimate of how much time the average airman needs to learn to perform a task satisfactorily. Each individual completing a TD booklet rated all inventory tasks on a 9-point scale (from extremely low to extremely high). TD data were independently collected from 51 experienced 7-skill level personnel stationed worldwide. Interrater reliability was calculated and found acceptable. Ratings were standardized so tasks

TABLE 1

MAJCOM REPRESENTATION OF SURVEY SAMPLE

MAJCOM	PERCENT OF ASSIGNED*	PERCENT OF SAMPLE
ACC	30	30
PACAF	15	13
AMC	15	15
AFMC	14	15
AETC	10	11
USAFE	8	7
AFSPACECOM	5	6
USAFA	1	1
AFSOC	1	1
AFDW	**	**

TOTAL ASSIGNED = 1,892
TOTAL SURVEYED = 1,689
TOTAL IN SAMPLE = 1,192
PERCENT OF ASSIGNED IN SAMPLE = 63%
PERCENT OF SURVEYED IN SAMPLE = 71%

* As of July 1993
** Denotes less than 1 percent

NOTE: Columns may not add exactly to 100 percent due to rounding

TABLE 2

PAYGRADE DISTRIBUTION OF SAMPLE

PAYGRADE	PERCENT OF ASSIGNED*	PERCENT OF SAMPLE
E-1 TO E-3	39	49
E-4	19	14
E-5	20	17
E-6	12	10
E-7	9	9
E-8	**	**

* As of December 1993
** Denotes less than 1 percent

NOTE: Columns may not add exactly to 100 percent due to rounding

have an average difficulty rating of 5.00, with a standard deviation of 1.00. The resulting data yield essentially a rank ordering of tasks indicating the degree of difficulty for each task in the inventory.

Training Emphasis (TE). Individuals completing TE booklets were asked to rate tasks on a 10-point scale from no training required to extremely high amount of TE. TE is a rating of which tasks require emphasis in structured training for first-term personnel. Structured training is defined as training provided by resident technical schools, field training detachments, mobile training teams, formal on-the-job training (OJT), or any other organized training method. TE data were independently collected from 51 experienced 7-skill level personnel stationed worldwide. As with TD ratings, the interrater reliability was computed and found to be acceptable, indicating there was sufficient agreement among raters as to which tasks require some form of structured training. In this specialty, the average TE rating was 2.57, and the standard deviation was 1.24. Tasks rated high in TE are rated 3.81 and above. As was discussed in the TD section above, TE data may also be used to rank order tasks, indicating those tasks which senior noncommissioned officers (NCOs) in the field consider the most important for first-enlistment airmen to be trained to perform.

When used in conjunction with the primary criterion of percent members performing, TD and TE ratings can provide insight into first-enlistment personnel training requirements. Such insights may suggest a need for lengthening or shortening portions of instruction supporting AFS entry-level jobs.

SPECIALTY JOBS
(Career Ladder Structure)

Each Air Force occupational analysis begins with an examination of the career ladder structure. The structure of jobs within the Utilities System career ladder was examined on the basis of similarity of tasks performed and the percent of time spent ratings provided by job incumbents, independent of other specialty background factors.

Each individual in the sample performs a set of tasks called a *Job*. A hierarchical grouping program, which is a basic part of the Comprehensive Occupational Data Analysis Program system, creates an individual job description for each respondent (all the tasks performed by that individual and the relative amount of time spent on those tasks). It then compares each job description to every other job description in terms of tasks performed and the relative amount of time spent on each task in the JI. The automated system locates the two job descriptions with the most similar tasks and percent time ratings and combines them to form a composite job description. In successive stages, the system adds new members to the initial group or forms new groups based on the similarity of tasks performed and similar time ratings in the individual job descriptions.

When there is a substantial degree of similarity between jobs, they are grouped together and identified as a *Cluster*. The job structure resulting from this grouping process (the various jobs and clusters within the career ladder) can be used to evaluate the accuracy of career ladder documents (Career Field Education and Training Plans (CFETP), AFMAN 36-2108 *Specialty Description*, and Specialty Training Standards (STS)), and to gain a better understanding of current utilization patterns.

Overview of Specialty Jobs

Based on the similarity of tasks performed and the amount of time spent performing each task, 2 clusters, and 8 jobs were identified within the AFSC 3E4X1 survey sample. A listing of these jobs is provided below and illustrated in Figure 1. The stage (ST) number shown beside each title references computer-generated information; the letter "N" stands for the number of personnel in each group.

I. Fire Suppression (STG229, N=12)

II. Plumbing Installation (STG282, N=10)

III Plumbing Cluster (STG116, N=639)

IV. Swimming Pool Maintenance Cluster (STG113, N=70)

V. Wastewater Systems Operations (STG251, N=67)

VI. Supervision (STG118, N=116)

VII. Field Water Purification Plant Operations (STG375, N=11)

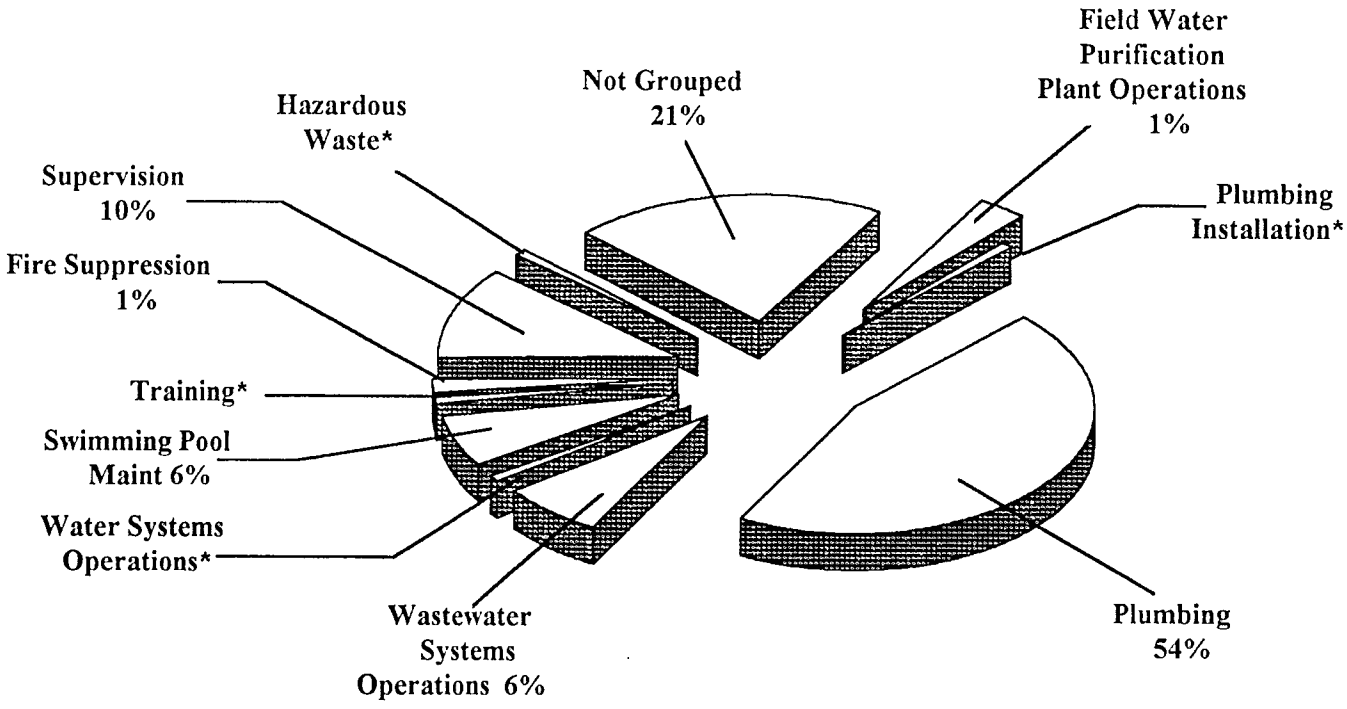
VIII. Water Systems Operations (STG261, N=5)

IX. Hazardous Waste (STG294, N=7)

X. Training (STG383, N=7)

The respondents forming these groups account for 79 percent of the survey sample. The remaining 21 percent are performing tasks or a series of tasks that do not group with any of the defined jobs. Examples of job titles for these people include: NCOIC Zone, Assistant Self-Help Foreman, Work Scheduler, Structural Specialist Craft Team Leader, and NCOIC of Planning.

JOBS PERFORMED BY AFSC 3E4X1 PERSONNEL



* Less than 1%

FIGURE 1

Group Descriptions

The following paragraphs contain brief descriptions of the 10 jobs identified through the career ladder structure analysis. Also presented are two tables that reflect the time incumbents spend on duties and selected background data for each group. Table 3 presents the relative time spent by respondents in each job across each duty listed in the JI. Table 4 displays selected background information, such as DAFSC distributions across each group, average of total months in active military service (i.e., Total Active Federal Military Service (TAFMS)), and average number of tasks performed. Appendix A at the back of this OSR lists representative tasks performed by members of each group.

I. FIRE SUPPRESSION (STG229, N=12). This job primarily involves maintenance of fire suppression systems. It is very specialized in that the job incumbents spend 44 percent of their time performing tasks in Duty R, Installing and Maintaining Fire Suppression Systems, such as deluge, wet-pipe, dry-pipe, foam, and preaction fire suppression systems. More time is spent on Duty R than any other duty. Typical tasks performed by incumbents include:

troubleshoot pressure fluctuations in fire suppression systems
replace wet-pipe fire suppression system components
inspect foam fire suppression systems
troubleshoot malfunctions to defective water gong alarms
clean fire suppression systems valve enclosures
inspect preaction fire suppression systems
reset preaction fire suppression systems
inspect dry-pipe fire suppression systems
inspect wet-pipe fire suppression systems
perform residual pressure tests on valves of wet-pipe fire suppression systems

With an average of almost 8 years in the career field, and 101 months TAFMS, the average grade is E-4 for these personnel. Sixty-seven percent report holding a 5-skill level and 25 percent are in their first enlistment.

II. PLUMBING INSTALLATION (STG282, N=10). Although personnel with this job perform a variety of common plumbing tasks, this job was identified as a result of the amount of time spent focusing on only installing and replacing pipe, tubing, fitting and appurtenances. Incumbents spent the most time (44 percent) on Duty H. Tasks that characterize this job include the following:

TABLE 3

AVERAGE PERCENT TIME SPENT ON DUTIES BY AFSC 3E4X1 JOB GROUPS

DUTIES	FIRE SUPPRESSION (STG229)	PLUMBING INSTALLATION (STG282)	PLUMBING (STG116)	SWIMMING POOL MAINT (STG113)	WASTE-WATER SYS OPS (STG251)
A ORGANIZING AND PLANNING	2	2	2	1	1
B DIRECTING AND IMPLEMENTING	3	1	3	2	1
C INSPECTING AND EVALUATING	2	1	1	1	1
D TRAINING	1	1	1	1	1
E PERFORMING ADMINISTRATIVE AND SUPPLY ACTIVITIES	2	2	3	2	1
F PERFORMING ENVIRONMENTAL OR SAFETY ACTIVITIES	*	*	1	3	2
G PERFORMING GENERAL OPERATIONS OR MAINTENANCE ACTIVITIES	6	11	14	21	18
H INSTALLING OR REPLACING PIPE, TUBING, FITTINGS, OR APPURTENANCES	8	44	21	8	6
I INSTALLING & MAINTAINING PLUMBING FIXTURES & EQUIPMENT	*	3	11	1	*
J MAINTAINING VALVES	18	9	16	9	6
K MAINTAINING WATER DISTRIBUTION SYSTEMS	2	3	6	5	2
L OPERATING & MAINTAINING INSTALLATION WATER TREATMENT SYSTEMS	1	0	1	6	4
M OPERATING & MAINTAINING SWIMMING POOLS	2	*	2	16	5
N PERFORMING WATER SAMPLING, TESTING, & ANALYSES	*	*	1	6	6
O MAINTAINING SANITARY WASTE & SEWER SYSTEMS	1	4	5	5	4
P OPERATING & MAINTAINING WASTEWATER TREATMENT SYSTEMS	*	0	1	3	24
Q PERFORMING WASTEWATER SAMPLING, TESTING, & ANALYSES	*	0	*	1	11
R INSTALLING & MAINTAINING FIRE SUPPRESSION SYSTEMS	44	1	2	1	*
S MAINTAINING GAS DISTRIBUTION SYSTEMS	*	1	2	1	*
T MAINTAINING PNEUMATIC SYSTEMS	*	0	*	*	*
U OPERATING & MAINTAINING SPECIALIZED & FIELD WATER TREATMENT EQUIPMENT	1	4	1	1	1
V PERFORMING CONTINGENCY OR TACTICAL TEAM ACTIVITIES	5	12	6	6	3

* Denotes less than 1 percent

NOTE: Columns may not add to 100 percent due to rounding

TABLE 3 (CONTINUED)

AVERAGE PERCENT TIME SPENT ON DUTIES BY AFSC 3E4X1 JOB GROUPS

DUTIES		SUPERVISION (STG118)	FIELD WATER PURIFICATION PLANT OPS (STG375)	WATER SYSTEMS OPS (STG261)	HAZARDOUS WASTE (STG294)	TRAINING (STG383)
A	ORGANIZING AND PLANNING	17	6	0	4	6
B	DIRECTING AND IMPLEMENTING	15	5	0	9	12
C	INSPECTING AND EVALUATING	14	4	1	5	7
D	TRAINING	7	5	1	3	71
E	PERFORMING ADMINISTRATIVE AND SUPPLY ACTIVITIES	10	8	2	3	1
F	PERFORMING ENVIRONMENTAL OR SAFETY ACTIVITIES	3	1	3	55	1
G	PERFORMING GENERAL OPERATIONS OR MAINTENANCE ACTIVITIES	7	8	20	1	1
H	INSTALLING OR REPLACING PIPE, TUBING, FITTINGS, OR APPURTENANCES	3	6	1	0	0
I	INSTALLING & MAINTAINING PLUMBING FIXTURES & EQUIPMENT	1	1	0	0	0
J	MAINTAINING VALVES	3	8	11	0	0
K	MAINTAINING WATER DISTRIBUTION SYSTEMS	2	*	6	0	0
L	OPERATING & MAINTAINING INSTALLATION WATER TREATMENT SYSTEMS	2	*	21	0	0
M	OPERATING & MAINTAINING SWIMMING POOLS	2	0	0	0	0
N	PERFORMING WATER SAMPLING, TESTING, & ANALYSES	1	1	12	1	0
O	MAINTAINING SANITARY WASTE & SEWER SYSTEMS	2	0	4	0	0
P	OPERATING & MAINTAINING WASTEWATER TREATMENT SYSTEMS	3	*	3	0	0
Q	PERFORMING WASTEWATER SAMPLING, TESTING, & ANALYSES	1	*	2	0	0
R	INSTALLING & MAINTAINING FIRE SUPPRESSION SYSTEMS	*	*	0	0	0
S	MAINTAINING GAS DISTRIBUTION SYSTEMS	*	*	0	0	0
T	MAINTAINING PNEUMATIC SYSTEMS	*	*	0	0	0
U	OPERATING & MAINTAINING SPECIALIZED & FIELD WATER TREATMENT EQUIPMENT	1	27	0	2	0
V	PERFORMING CONTINGENCY OR TACTICAL TEAM ACTIVITIES	6	17	13	17	1

* Denotes less than 1 percent

NOTE: Columns may not add to 100 percent due to rounding

TABLE 4

SELECTED BACKGROUND DATA FOR AFSC 3E4X1 CAREER LADDER JOBS

	FIRE SUPPRESSION (STG229)	PLUMBING INSTALLATION (STG282)	PLUMBING (STG116)	SWIMMING POOL MAINT (STG113)	WASTE-WATER SYS OPS (STG251)
NUMBER IN GROUP	12	10	639	70	67
PERCENT OF SAMPLE	1%	*	54%	6%	6%
PERCENT IN CONUS	67%	90%	82%	84%	85%
DAFSC DISTRIBUTION:					
3E431	25%	50%	31%	36%	40%
3E451	67%	50%	54%	60%	55%
3E471	8%	0%	15%	4%	4%
PREDOMINANT PAYGRADE(S)	E-4	E-4	E-4	E-4	E-3/E-4
AVERAGE MONTHS IN SERVICE (TAFMS)	101	55	80	66	59
PERCENT IN FIRST ENLISTMENT	25%	60%	46%	51%	53%
AVERAGE # OF TASKS PERFORMED	125	71	211	102	181
PERCENT SUPERVISING	1%	0%	2%	*	*

* Less than 1 percent

NOTE: Columns may not add to 100 percent due to rounding

TABLE 4 (CONTINUED)

SELECTED BACKGROUND DATA FOR AFSC 3E4X1 CAREER LADDER JOBS

	SUPERVISION (STG118)	FIELD WATER PURIFICATION PLANT OPS (STG375)	WATER SYSTEMS OPS (STG261)	HAZARDOUS WASTE (STG294)	TRAINING (STG383)
NUMBER IN GROUP	116	11	5	7	7
PERCENT OF SAMPLE	10%	*	1%	*	*
PERCENT IN CONUS	66%	100%	0%	71%	86%
DAFSC DISTRIBUTION:					
3E431	0%	9%	0%	0%	0%
3E451	23%	55%	100%	86%	14%
3E471	77%	36%	0%	14%	86%
PREDOMINANT PAYGRADE(S)	E-7	E-4	E-4/E-5	E-4/E-5	E-6
AVERAGE MONTHS IN SERVICE (TAFMS)	177	82	111	108	148
PERCENT IN FIRST ENLISTMENT	5%	9%	40%	14%	0%
AVERAGE # OF TASKS PERFORMED	150	96	68	34	16
PERCENT SUPERVISING	9%	1%	0%	*	*

* Less than 1 percent

NOTE: Columns may not add to 100 percent due to rounding

measure pipe
cut plastic pipe or tubing
assemble plastic pipe using solvent weld joints
assemble or disassemble plastic pipe fittings
ream piping or tubing
thread pipe using mounted power threaders
thread pipe using hand threaders

These personnel have the least experience in the career ladder, report an average of 3 years in the career field, 55 months TAFMS and 60 percent indicate they are in their first enlistment. Of the 10 members, 5 hold the 5-skill level and the other 5 hold the 3-skill level. The predominant paygrade of job incumbents is E-4.

III. PLUMBING CLUSTER (STG116, N=639). The plumbing jobs are performed by the largest number of respondents, comprising 54 percent of the sample. The 639 incumbents in the plumbing cluster perform common core tasks. The six jobs identified within the plumbing cluster were distinguished by specific functions: working with drains, leaks, lawn sprinklers, valves, trenches, and pumps. Thirty percent reported that their jobs involve supervising others. Sixty-two percent of their relative job time is devoted to tasks and duties associated with installing, replacing, or maintaining the following: piping, tubing, fittings, valves, fixtures and equipment. Examples of plumbing tasks performed by members within this cluster include:

assemble or dissemble plastic pipe fittings
cut copper pipe or tubing
assemble galvanized, black iron, or steel pipe
cut plastic pipe or tubing
assemble or dissemble threaded pipe fittings
install gate valves
cut galvanized, black iron, or steel pipe
maintain handtools
measure pipe

Members in this cluster report an average grade of E-4 and 4 years in their present job. Forty-six percent are still in their first enlistment and 54 percent report holding a 5-skill level. These personnel report an average of 80 months TAFMS.

IV. SWIMMING POOL MAINTENANCE CLUSTER (STG113, N=70). Personnel in this job are involved with the maintenance and operation of swimming pools and the chemical treatment in water systems. Incumbents perform an average of 102 tasks. Typical job responsibilities include inspecting, servicing, and maintaining pools. Tasks that characterize this job include the following:

adjust pH in pools
backwash pool filters
clean pool hair catchers
maintain chlorine level in pools
add chemicals to chemical feeders
collect pool water samples
fill pools
adjust chemical feeders

Incumbents holding this job average a little more than 5 years in the career field. The predominant paygrade is E-4 and 60 percent of the members hold a 5-skill level. Fifty-one percent of the incumbents are in their first enlistment.

V. WASTEWATER SYSTEMS OPERATIONS (STG251, N=67). Personnel in this job are assigned to the wastewater treatment plant section. Twenty-four percent of their time is spent operating and maintaining wastewater treatment systems. They perform an average of 181 tasks dealing with performing pH tests, checking wastewater sample temperatures and cleaning equipment. Typical tasks which members perform include:

perform pH tests of wastewater samples
operate digesters
check wastewater sample temperatures
check operations of sewer lift pumps
perform settleable solid tests of wastewater samples
repack pumps
perform dissolved oxygen (do) tests of wastewater samples
clean wastewater treatment testing equipment
adjust chemical feeders

Members with this job average almost 5 years TAFMS, 55 percent hold a 5-skill level and 66 percent are in paygrades E-3 and E-4. Eighty-five percent of the personnel are assigned to CONUS locations.

VI. SUPERVISION (STG118, N=116). Unlike the first five technically oriented jobs, personnel in this job primarily perform supervisory and management tasks. Incumbents spend 46 percent of their time on supervisory and administrative duties. These include supervising, counseling, and evaluating subordinates, coordinating work requirements, and determining logistics requirements. The following are typical tasks the members of this job perform:

write EPRs
establish work priorities
assign personnel to work areas or duty positions
counsel personnel on personal or military-related matters
schedule personnel for leave, passes, or temporary duties (TDYs)
coordinate work activities with other civil engineering (CE) shops
inspect personnel for compliance with military standards
determine logistics requirements, such as equipment, personnel, or space
plan or schedule work assignments

The most senior personnel in the career ladder hold this job. The predominant paygrade is E-7 and 77 percent hold the 7-skill level. Personnel average 177 months TAFMS.

VII. FIELD WATER PURIFICATION PLANT OPERATIONS (STG375, N=11). This job primarily involves specialized and field water treatment equipment. Personnel perform an average of 96 tasks. They include setting up and disassembling field shower units, latrines and osmosis units. Typical tasks performed by members with this job include:

disassemble Harvest Bare, Harvest Falcon, or Harvest Eagle field shower units
set up Harvest Bare, Harvest Falcon, or Harvest Eagle field shower units
set up reverse osmosis water purification units
operate reverse osmosis units
clean components of reverse osmosis units
dissemble Harvest Bare, Harvest Falcon, or Harvest Eagle field shower units
operate Harvest Bare, Harvest Falcon, or Harvest Eagle field shower units
install components of reverse osmosis units

All members are assigned to ACC. The majority of the members hold a 5- or 7-skill level and average 82 months TAFMS. The predominant paygrade is E-4.

VIII. WATER SYSTEMS OPERATIONS (STG261, N=5). Incumbents in this job perform an average of 68 tasks. Twenty percent of their time is spent performing general operations or maintenance activities, while an additional 21 percent is spent operating and maintaining installation water treatment systems. Their work involves operating water wells, pumps, and fluoridators. Examples of tasks performed include:

operate water wells
operate well pumps
operate fluoridators
perform pH tests of water samples
perform fluoride tests of water samples
install chlorine cylinders
remove chlorine cylinders
clean water treatment testing equipment
inspect check valves
inspect gate valves

One hundred percent of the personnel in this job hold the 5-skill level, average 111 months TAFMS, are in paygrades E-4 and E-5 and are all assigned to bases outside of CONUS.

IX. HAZARDOUS WASTE (STG294, N=7). Members in this job spend 55 percent of their time performing environment or safety activities. They deal with inspecting, storing, disposing, and transporting hazardous waste. Personnel with this job are distinguished by the time they spend on the following tasks:

maintain hazardous waste documentation records or log books
inspect stored hazardous waste materials
dispose of hazardous waste materials, other than asbestos
inspect markings or decals on waste or acid drums
maintain hazardous waste spill kits
store hazardous waste materials
contain hazardous waste spills
inspect condition of respirator harnesses

Respondents holding this job are moderately experienced, averaging over 7 years time in service. Eighty-six percent hold the 5-skill level, are in paygrades E-4 and E-5, and only 14 percent are in their first enlistment.

X. TRAINING (STG383, N=7). Five of the seven personnel in the training job are assigned to the school at Sheppard AFB TX. Respondents with this job spend 71 percent of their duty time performing training tasks. This includes classroom teaching and counseling and evaluating trainees in progress. The following tasks distinguish these jobs from others in the career field:

counsel trainees on training progress
conduct resident course classroom training
evaluate progress of trainees
administer or score tests
evaluate training methods and techniques
write test questions

Personnel with the training job hold either the 5- or 7-skill level. They are in paygrade E-6, average 148 months TAFMS, and none are in their first enlistment.

Comparison of Current Jobs to Previous Survey Findings

The results of the specialty job analysis were compared to those of the last Plumbing OSR published in 1987 and the Environmental Support OSR published in 1985. Although the job titles vary among the three studies, generally the tasks that personnel in these studies perform are the same. As shown in Table 5, all but one of the jobs in the current study was identified in either the 1985 Plumbing or 1987 Environmental Support OSR. However, one job in the 1985 survey and two jobs in the 1987 survey were identified that were not identified as distinct jobs in the present survey. These were the Planners and Prime Beef in the Plumbing OSR, and General Environmental Support Personnel in the Environmental Support OSR.

ANALYSIS OF DAFSC GROUPS

An analysis of DAFSC groups, in conjunction with the analysis of the career ladder structure, is an important part of each occupational survey. The DAFSC analysis identifies differences in tasks performed at the various skill levels. This information may be used to evaluate how well career ladder documents, such as the CFETP, AFMAN 36-2108 *Specialty Description*, and the STS, reflect what career ladder personnel are actually doing in the field.

The distribution of skill-level groups across the 10 career ladder jobs is displayed in Table 6, while Table 7 offers another perspective by displaying the relative percent time spent on each duty across the skill-level groups.

TABLE 5

COMPARISON OF JOB GROUPS IN CURRENT STUDY VERSUS 1987 AND 1985 STUDIES

UTILITIES SYSTEM 1995 STUDY (N=1,192)	PLUMBING 1987 STUDY (N=1,497)	ENVIRONMENTAL SUPPORT 1985 STUDY (N=1,165)
Fire Suppression	Fire Suppression	*
Plumbing Installation	Plumbing	*
Plumbing Cluster	Plumbing	*
Swimming Pool Maintenance Cluster	*	Lift Station and Pool Operators Supervisors Pool Operators
Wastewater Systems Operations	*	Wastewater Treatment Systems Personnel Lift Station and Pool Operators Wastewater Analysis Personnel
Supervision	Supervisory Personnel	Environmental Support Managers & Supervisors
Field Water Purification Plant Operations	Rapid Engineer Deplorable Heavy Operations Repair Squadrons Engineer	Instructors and Field Water Treatment Personnel
Water Systems Operations	*	Water Treatment Systems Personnel Industrial Water Treatment Systems Personnel
Hazardous Waste	*	*
Training	Training	Instructors and Field Water Treatment Personnel
Not identified	Planners	*
Not identified	Prime Beef	*
Not identified	*	General Environmental Support Personnel

* Denotes Jobs Not Related to AFSC

TABLE 6

DISTRIBUTION OF SKILL-LEVEL MEMBERS ACROSS CAREER LADDER JOBS (PERCENT MEMBERS RESPONDING)

JOB		DAFSC 3E431 (N=346)	DAFSC 3E451 (N=585)	DAFSC 3E471 (N=261)
I.	Fire Suppression	1	1	*
II.	Plumbing Installation	1	1	0
III.	Plumbing Cluster	57	59	37
IV.	Swimming Pool Maintenance Cluster	7	7	1
V.	Wastewater Systems Operations	8	6	1
VI.	Supervision	0	5	34
VII.	Field Water Purification Plant Ops	*	1	2
VIII.	Water Systems Operations	0	*	*
IX.	Hazardous Waste	0	1	*
X.	Training	0	*	2
XI.	Not Grouped	26	19	23

* Denotes less than 1 percent

TABLE 7

TIME SPENT ON DUTIES BY MEMBERS OF SKILL-LEVEL GROUPS
(RELATIVE PERCENT OF JOB TIME)

DUTIES		DAFSC 3E431 (N=346)	DAFSC 3E451 (N=585)	DAFSC 3E471 (N=261)
A	ORGANIZING AND PLANNING	1	3	13
B	DIRECTING AND IMPLEMENTING	2	3	12
C	INSPECTING AND EVALUATING	*	2	10
D	TRAINING	*	1	8
E	PERFORMING ADMINISTRATIVE OR SUPPLY FUNCTIONS	2	4	8
F	PERFORMING ENVIRONMENTAL OR SAFETY ACTIVITIES	1	3	2
G	PERFORMING GENERAL OPERATIONS OR MAINTENANCE ACTIVITIES	17	15	8
H	INSTALLING AND REPLACING PIPE, TUBING, FITTINGS, AND APPURTENANCES	19	16	8
I	INSTALLING AND MAINTAINING PLUMBING FIXTURES AND EQUIPMENT	9	7	3
J	MAINTAINING VALVES	13	12	5
K	MAINTAINING WATER DISTRIBUTION SYSTEMS	5	5	3
L	OPERATING & MAINTAINING INSTALLATION WATER TREATMENT SYSTEMS	2	2	1
M	OPERATING & MAINTAINING SWIMMING POOLS	3	3	1
N	PERFORMING WATER SAMPLING, TESTING, & ANALYSES	3	2	1
O	MAINTAINING SANITARY WASTE SEWER SYSTEMS	5	4	2
P	OPERATING & MAINTAINING WASTEWATER TREATMENT SYSTEMS	4	3	2
Q	PERFORMING WASTEWATER SAMPLING, TESTING, & ANALYSES	2	1	1
R	INSTALLING & MAINTAINING FIRE SUPPRESSION SYSTEMS	2	3	2
S	MAINTAINING GAS DISTRIBUTION SYSTEMS	1	1	1
T	MAINTAINING PNEUMATIC SYSTEMS	*	*	*
U	OPERATING & AND MAINTAINING SPECIALIZED AND FIELD WATER TREATMENT EQUIPMENT	1	2	1
V	PERFORMING CONTINGENCY OR TACTICAL TEAM ACTIVITIES	7	7	7

NOTE: Columns may not add to 100 percent due to rounding

A typical pattern of progression is noted within the AFSC 3E4X1 career ladder. Personnel at the 3- and 5-skill levels work in the technical jobs of the career ladder and spend most of their time performing utilities activities. As incumbents move up to the 7-skill level, higher percentages perform supervision functions, but they still spend some time on technical activities (see Tables 6 and 7).

Skill-Level Descriptions

DAFSC 3E431. The 346 airmen in the 3-skill level group, representing 29 percent of the survey sample, spend most of their job time on plumbing activities (see Table 7). Fifty-seven percent are working in the Plumbing job (see Table 6). The focus of their job is shown by figures in Table 8, which lists representative tasks performed by 3-skill level incumbents. Most tasks listed relate to Duty H (Installing and Replacing Pipe, Tubing, Fittings and Appurtenances).

DAFSC 3E451. The 585 airmen in the 5-skill level group represent 49 percent of the total survey sample. As with 3-skill level personnel, the largest percentages of these incumbents are working in the Plumbing job (59 percent). Time on duties show an increase in time spent on supervisory duties (see Table 7).

Representative tasks performed by 5-skill level incumbents are listed in Table 9. Table 10 reflects those tasks which best differentiate 5-skill level personnel from their 3-skill level counterparts. Figures show the jobs are quite similar, except a higher percentage of 5-skill level personnel perform some supervisory tasks.

DAFSC 3E471. Seven-skill level personnel represent 22 percent of the survey sample. Unlike their junior counterparts at the 3- and 5-skill levels, a larger percentage of these 346 personnel perform supervisory duties (35 percent versus less than 3 percent and 8 percent for the 3- and 5-skill levels, respectively) (see Table 7). Thirty-four percent of 7-skill level personnel perform the Supervision job, while 37 percent are in the Plumbing job (see Table 6). Table 11 lists the most common tasks performed by 7-skill level personnel. Most of these tasks involve supervisory functions. Table 12 shows those tasks that best differentiate the 5- and 7-skill levels. As expected, the key difference is a greater emphasis on supervisory and administrative functions at the 7-skill level.

Summary

Progression in this career ladder follows a normal pattern of highly technical job focus at the lower skill levels with a broadening into supervision at the 7-skill level. Emphasis is seen in performing primarily plumbing activities at the 3- and 5-skill levels.

TABLE 8

REPRESENTATIVE TASKS PERFORMED BY DAFSC 3E431 PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N= 346)
G270	Maintain handtools	69
H369	Assemble or disassemble plastic pipe fittings	69
H400	Cut plastic pipe or tubing	68
H388	Cut copper pipe or tubing	66
H413	Measure pipe	65
H371	Assemble or dissemble threaded pipe fittings	62
H374	Assemble plastic pipe using solvent weld joints	60
J544	Install gate valves	60
H390	Cut galvanized, black iron, or steel pipe	60
V1167	Fire weapons for qualification or proficiency	60
H415	Ream piping or tubing	60
H365	Assemble galvanized, black iron, or steel pipe	58
H363	Assemble copper tubing using sweat solder	58
H426	Thread pipe using mounted pipe threaders	57
J537	Install ball valves	56
J580	Remove gate valves	53
H360	Assemble copper tubing using ferruled fittings	53
G224	Clean pipe threading machines	52
H359	Assemble copper tubing using compression couplings	52
H361	assemble copper tubing using flared fittings	53
H425	Thread pipe using hand threaders	53
J536	Install angle valves	51
J539	Install check valves	49
H380	Bend tubing by hand	49
K647	Locate water pipe leaks	49
V1168	Inspect mobility bags or kits	48
I428	Adjust water flow of water fountains	47
H370	Assemble or disassemble plastic tubing	47
J541	Install faucets	47
J542	Install flushometer valves	46
H376	Assemble plastic pipe using plastic joints	46
I460	Install urinals	46
I461	Install water fountains	45

TABLE 9

REPRESENTATIVE TASKS PERFORMED BY DAFSC 3E451 PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=585)
G270	Maintain handtools	94
H400	Cut plastic pipe or tubing	92
H369	Assemble or disassemble plastic pipe fittings	89
J544	Install gate valves	89
H388	Cut copper pipe or tubing	89
V1167	Fire weapons for qualification or proficiency	87
H371	Assemble or disassemble threaded pipe fittings	87
H413	Measure pipe	87
H365	Assemble galvanized, black iron, or steel pipe	87
H390	Cut galvanized, black iron, or steel pipe	86
V1168	Inspect mobility bags or kits	86
H374	Assemble plastic pipe using solvent weld joints	86
H363	Assemble copper tubing using sweat solder	86
H415	Ream piping or tubing	85
J580	Remove gate valves	85
H361	Assemble copper tubing using flared fittings	85
K647	Locate water leaks	85
J537	Install ball valves	83
H426	Thread pipe using mounted power threaders	83
O787	Open clogged or restricted drains using power-operated augers	83
H360	Assemble copper tubing ferruled fittings	82
H380	Bend tubing by hand	82
H361	Assemble copper tubing using flared fittings	82
G224	Clean pipe threading machines	80
J527	Inspect gate valves	80
V1209	Tear down, inspect, clean, and reassemble weapons, such as M-16 rifles	80

TABLE 10

TASKS WHICH BEST DIFFERENTIATE BETWEEN DAFSC 3E431 AND DAFSC 3E451 PERSONNEL (PERCENT MEMBERS PERFORMING)

TASKS		3E431 (N= 346)	3E451 (N=585)	DIFFERENCE
C113	Write EPRs	1	36	-35
D119	Conduct OJT	11	43	-32
B78	Supervise Utilities System Apprentices (AFSC 3E431)	5	35	-30
B39	Counsel personnel on personal or military-related matters	3	31	-28
A7	Coordinate work activities with other civil engineering (CE) shops	18	44	-26
A1	Assign personnel to work areas or duty positions	6	30	-24
D1221	Counsel trainees on training progress	1	24	-23
C106	Inspect personnel for compliance with military standards	1	24	-23

TABLE 11

REPRESENTATIVE TASKS PERFORMED BY DAFSC 3E471 PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N= 261)
C113	Write EPRs	82
B39	Counsel personnel on personal or military-related matters	75
A1	Assign personnel to work areas or duty positions	73
A23	Establish work priorities	71
A7	Coordinate work activities with other civil engineering (CE) shops	70
B79	Supervise Utilities System Journeymen (AFSC 3E451)	67
C115	Write recommendations for awards or decorations	67
C106	Inspect personnel for compliance with military standards	66
A29	Plan or schedule work assignments	66
A33	Schedule personnel for leave, passes, or temporary duties (TDYs)	63
V1167	Fire weapons for qualification or proficiency	62
B38	Conduct supervisory orientation of newly assigned personnel	62
C94	Evaluate personnel for compliance with performance standards	60
B78	Supervise Utilities System Apprentices (AFSC 3E431)	60
A20	Establish performance standards for subordinates	60
D122	Counsel trainees on training progress	59
A30	Plan or schedule work priorities	59
C95	Evaluate personnel for compliance for promotion, demotion, reclassification, or special awards	57
A9	Determine logistics requirements, such as equipment, personnel or space	57
A8	Coordinate work requirements with CE subordinates	57
A2	Assign sponsors for newly assigned personnel	57
D131	Evaluate progress for trainees	56
D119	Conduct OJT	57
V1168	Inspect mobility bags or kits	53
D130	Evaluate personnel for training needs	52
D134	Maintain training records, charts, or graphs	51
A22	Establish work methods or controls	51
E154	Order parts using WIMS	51
E140	Assign equipment, tools, or vehicles to personnel	51

TABLE 12

TASKS WHICH BEST DIFFERENTIATE BETWEEN DAFSC 3E451 AND DAFSC 3E471 PERSONNEL (PERCENT MEMBERS PERFORMING)

TASKS		3E451 (N=585)	3E471 (N=261)	DIFFERENCE
G388	Maintain handtools	75	45	30
H388	Cut copper pipe or tubing	65	39	26
H369	Assemble or disassemble plastic pipe fittings	69	46	23
H400	Cut plastic pipe or tubing	69	46	23
A33	Schedule personnel for leave, passes, or temporary duty duties (TDYs)	12	63	-51
B38	Conduct supervisory orientations of newly assigned personnel	15	62	-47
C113	Write EPRs	36	82	-46
A24	Establish work schedules	18	64	-46
C115	Write recommendations for awards or decorations	21	67	-46
A23	Establish work priorities	26	71	-45
B79	Supervise Utilities System Journeymen (AFSC 3E451)	23	67	-44
B39	Counsel personnel on personal or military-related matters	31	75	-44
A1	Assign personnel to work areas or duty positions	30	73	-43
A2	Assign sponsors for newly assigned personnel	15	57	-42
C95	Evaluate personnel for promotion, demotion, reclassification, or special awards	16	57	-41
C106	Inspect personnel for compliance with performance standards	24	66	-42
D118	Assign on-the-job training (OJT) trainers	10	49	-39
A8	Coordinate work requirements with CE superintendents	19	57	-38
A30	Plan or schedule work priorities	21	59	-38

ANALYSIS OF AFMAN 36-2108 *SPECIALTY DESCRIPTION*

Survey data were compared to the AFMAN 36-2108 *Specialty Description* for Utilities System, effective 31 October 1994. This specialty description is intended to provide a broad overview of the duties and responsibilities of each skill level. In general, the specialty description covers tasks and jobs performed by career ladder personnel.

TRAINING ANALYSIS

Occupational survey data represent one of many sources of information that are used to assist in the development of training programs for career ladder personnel. OSR data useful to training personnel include job descriptions for the various jobs performed within a career ladder, distribution of personnel across career ladder jobs, percentages of personnel performing specific tasks, and percentages of personnel maintaining specific equipment or systems, as well as the difficulty of tasks and TE ratings gathered from senior members of the career ladder.

TE and TD Data

TE and TD data are secondary factors that can help technical school personnel decide which entry-level training tasks to emphasize. These ratings, based on the judgments of senior career ladder NCOs at operational units, provide training personnel with a rank ordering of those tasks considered important for first-enlistment airman training (TE), and a measure of the difficulty of those tasks (TD). When combined with data on the percentages of first-enlistment personnel performing tasks, comparisons can be made to determine if training adjustments are necessary. For example, tasks receiving high ratings on both task factors (TE and TD), accompanied by moderate to high percentages performing, may warrant resident training. Those tasks receiving high task factor ratings but low percentages performing may be more appropriately planned for OJT programs within the career ladder. Low task factor ratings may highlight tasks best omitted from training for first-enlistment personnel. This decision must be weighed against percentages of personnel performing the tasks, command concerns, and criticality of the tasks.

To help training personnel focus on tasks that are most appropriate for entry-level training, an additional factor, the Automated Training Indicator (ATI), was assigned to each task in the inventory. A computer program considered percent first-enlistment members performing, TE and TD ratings, and the Course Training Decision Logic Table found in AETCR 52-22, Atch 1, and assigned an ATI value to each task corresponding to the 18 training decisions on the table. The decision table and explanation of ATIs precede the listing of tasks in descending order of ATI in the TRAINING EXTRACT. Training personnel should focus on tasks with an ATI of 18, which suggests these tasks should be in the entry-level course.

Tasks having the highest TE ratings are listed in Table 13. Included for each task are the percentage of first-job and first-enlistment personnel performing and the TD rating. Tasks with the highest TE deal with Performing General Operations or Maintenance Activities (Duty G).

Table 14 lists the tasks having the highest TD ratings. The percentages of first-job, first-enlistment, 5-, and 7-skill level personnel performing, and the TE ratings are also included for each task. The majority of tasks with high difficulty are not performed by high percentages of any group, but one task, Direct Installation, Maintenance, or Modifications of Fire Suppression Systems, is performed by at least 20 percent of 7-skill level personnel. Most of the tasks with high TD values are related to management functions.

Various lists of tasks, accompanied by TE and TD ratings, are contained in the TRAINING EXTRACT package and should be reviewed in detail by technical school personnel. For a more detailed explanation of TD and TE ratings, see the Task Factor Administration in the **SURVEY METHODOLOGY** section of this report.

First-Enlistment Personnel

In this study, there are 452 members in their first enlistment (1-48 months TAFMS), representing 38 percent of the survey sample. As displayed in Table 15, approximately 96 percent of their duty time is devoted to technical functions. Figure 2 shows how all first-enlistment personnel are distributed across the jobs identified in the **SPECIALTY JOBS** section of this report. Of the 10 jobs identified, a vast majority of personnel (58 percent) are involved in Plumbing activities.

Table 16 displays commonly performed tasks for first-enlistment personnel. The majority of tasks displayed involve installing and replacing pipe, tubing, fittings and appurtenances. Equipment utilized by 30 percent or more of first-job or first-enlistment personnel are listed in Table 17.

Specialty Training Standard (STS)

In September 1995, training personnel from Sheppard AFB TX matched tasks in the JI to appropriate sections of the draft STS. A listing of the STS was then produced showing each STS paragraph and subparagraph, tasks matched, percent criterion group members performing, TE and TD ratings, and ATI. This listing is included in the Training Extract sent to the school for review. Criteria set forth in ATCR 52-22, Attachment 1, were used to review the relevance of each STS paragraph and subparagraph with matched tasks.

General STS elements, such as Security, AF Occupational Safety and Health Program, USAF Graduate Evaluation Program, Environmental Awareness and Compliance, Supervision, and Training (paragraphs 1 through 7), were not reviewed. Technical areas covering STS

TABLE 13

DAFSC 3E4X1 TASKS WITH HIGHEST TRAINING EMPHASIS RATINGS

TASKS		TNG EMP	PERCENT MEMBERS PERFORMING 1ST JOB	PERCENT MEMBERS PERFORMING 1ST ENL	TSK DIF
H363	Assemble copper tubing using sweat solder	5.75	58	59	5.03
K641	Install fire hydrants	5.63	28	31	6.08
O790	Open clogged or restricted sewers using high-pressure water equipment	5.45	40	45	5.36
O787	Open clogged or restricted drains using power-operated augers	5.45	46	50	4.84
H365	Assemble galvanized, black iron, or steel pipe	5.43	53	58	4.49
K625	Flow test fire hydrants	5.43	28	30	5.01
G383	Calculate desired fall-per-foot of piping	5.41	26	29	5.06
H374	Assemble plastic pipe using solvent weld joints	5.39	57	59	3.82
H369	Assemble or disassemble plastic pipe fittings	5.39	66	69	3.92
G245	Inspect double check valve backflow prevention devices	5.37	14	20	5.34
K618	Assemble fire hydrants	5.31	21	25	5.63
J564	Locate and identify underground valves using base utilities maps	5.25	44	44	4.76
H371	Assemble or disassemble threaded pipe fittings	5.16	61	63	3.87
H413	Measure pipe	5.16	61	63	3.87
H366	Assemble or disassemble flanged pipe and fittings	5.14	36	41	4.37
K622	Disinfect water lines	5.12	16	22	5.25
H426	Thread pipe using mounted power threaders	5.08	53	55	4.69
K621	Disassemble fire hydrants	5.08	22	24	5.30
H360	Assemble copper tubing using ferruled fittings	5.06	53	53	4.06
K631	Inspect fire hydrants	5.06	34	36	5.34

TD MEAN = 5.00; SD = 1.00
TE MEAN = 2.57; SD = 1.24 (HIGH TE = 3.81)

TABLE 14

DAFSC 3E4X1 TASKS WITH HIGHEST TASK DIFFICULTY RATINGS

TASKS		TSK DIF	PERCENT MEMBERS PERFORMING 1ST JOB	1ST ENL	DAFSC 3E451	DAFSC 3E471	TNG EMP
A18	Draft plans for emergency water or wastewater facilities	7.83	3	3	5	16	.98
D94	Direct installation, maintenance, or modifications, of fire suppression systems	7.72	6	11	19	26	3.51
A12	Develop inputs to air base operability plans	7.69	3	3	5	16	0.07
S1053	Perform hot tappings on gas lines while under pressure	7.62	1	2	4	3	3.08
V1155	Drill water wells during contingency exercises or operations	7.49	1	0	1	1	2.49
G276	Operate backhoe equipment	7.48	11	14	17	15	2.98
F199	Perform asbestos abatement	7.40	3	5	6	4	1.51
B48	Direct installation or maintenance of oxygen systems	7.39	1	2	2	3	1.25
B43	Direct industrial wastewater processing	7.39	2	3	4	6	1.39
K656	Set up dewatering systems	7.38	2	2	3	4	1.27
G278	Operate gas or arc welding equipment	7.29	9	10	11	6	2.39
R988	Install or extend fixed-gaseous fire suppression systems	7.25	0	1	3	4	3.65
A5	Coordinate water and firefighting operations with command-level agencies	7.24	3	4	6	10	1.06
R989	Install or extend preaction fire suppression systems	7.14	1	3	6	6	3.63
C116	Write staff studies, surveys, or special reports, other than training reports	7.11	0	1	3	15	.35
C99	Evaluate water or wastewater plant operations	7.08	3	3	10	21	1.71
F200	Review asbestos materials	7.06	5	7	6	5	1.45

TD MEAN = 5.00 SD = 1.00
TE MEAN = 2.57; SD = 1.24 (HIGH TE = 3.81)

TABLE 15

RELATIVE PERCENT OF TIME SPENT ACROSS DUTIES BY FIRST-ENLISTMENT AFSC 3E4X1 PERSONNEL

DUTIES		PERCENT TIME SPENT
A	ORGANIZING AND PLANNING	1
B	DIRECTING AND IMPLEMENTING	2
	INSPECTING AND EVALUATING	*
	TRAINING	*
E	PERFORMING ADMINISTRATIVE OR SUPPLY ACTIVITIES	2
F	PERFORMING ENVIRONMENTAL OR SAFETY ACTIVITIES	2
G	PERFORMING GENERAL OPERATIONS OR MAINTENANCE ACTIVITIES	17
H	INSTALLING AND REPLACING PIPE, TUBING, FITTINGS, AND APPURTENANCES	19
I	INSTALLING AND MAINTAINING PLUMBING FIXTURES AND EQUIPMENT	9
J	MAINTAINING VALVES	13
K	MAINTAINING WATER DISTRIBUTION SYSTEMS	4
L	OPERATING AND MAINTAINING INSTALLATION WATER TREATMENT SYSTEMS	2
M	OPERATING AND MAINTAINING SWIMMING POOLS	3
N	PERFORMING WATER SAMPLING, TESTING, AND ANALYSES	3
O	MAINTAINING SANITARY WASTE AND SEWER SYSTEMS	5
P	OPERATING AND MAINTAINING WASTEWATER TREATMENT SYSTEMS	4
Q	PERFORMING WASTEWATER SAMPLING, TESTING, AND ANALYSES	2
R	INSTALLING AND MAINTAINING FIRE SUPPRESSION SYSTEMS	2
S	MAINTAINING GAS DISTRIBUTION SYSTEMS	1
T	MAINTAINING PNEUMATIC SYSTEMS	*
U	OPERATING AND MAINTAINING SPECIALIZED AND FIELD WATER TREATMENT EQUIPMENT	1
V	PERFORMING CONTINGENCY OR TACTICAL TEAM ACTIVITIES	7

* Denotes less than 1 percent

JOBS PERFORMED BY FIRST-ENLISTMENT AFSC 3E4X1 PERSONNEL

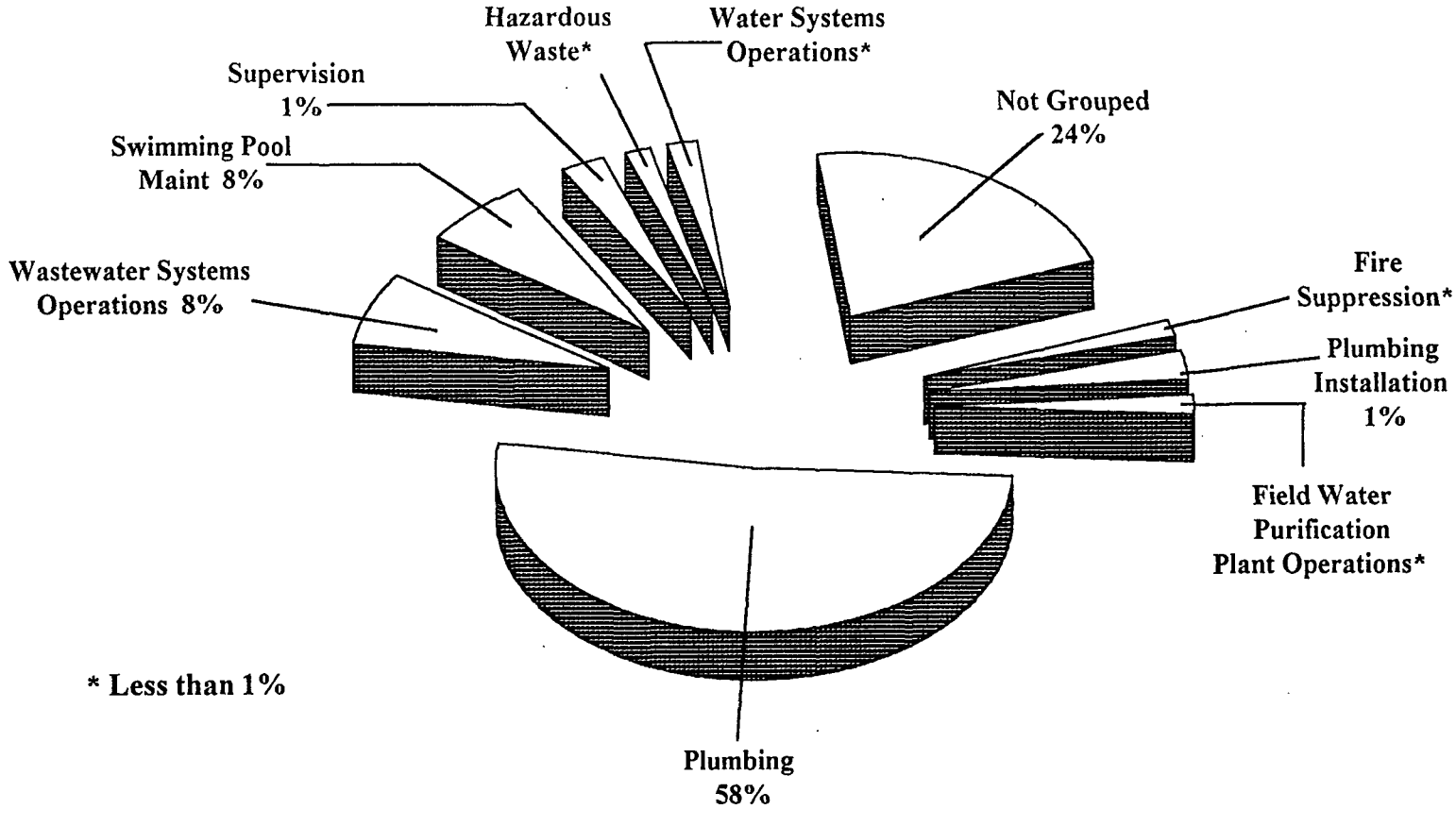


FIGURE 2

TABLE 16

MOST COMMONLY PERFORMED TASKS FOR FIRST-ENLISTMENT 3E4X1 PERSONNEL

TASKS		PERCENT MEMBERS PERFORMING (N=452)
G270	Maintain handtools	69
H400	Cut plastic pipe or tubing	69
H369	Assemble or disassemble plastic pipe fittings	69
G388	Cut copper pipe or tubing	66
H413	Measure pipe	66
H371	Assemble or disassemble threaded pipe fittings	63
J544	Install gate valves	62
V1167	Fire weapons for qualification or proficiency	60
H390	Cut galvanized, black iron, or steel pipe	59
H363	Assemble copper tubing using sweat weld joints	59
H374	Assemble plastic pipe using solvent weld joints	59
H415	Ream piping or tubing	59
H365	Assemble galvanized, black iron, or steel pipe	58
J537	Install ball valves	56
H426	Thread pipe using mounted power threaders	55
H360	Assemble copper tubing using ferruled fittings	53
H361	Assemble copper tubing using flared fittings	53
J580	Remove gate valves	52
H425	Thread pipe using hand threaders	52
G224	Cut pipe threading machines	52
H359	Assemble copper tubing using compression couplings	52
J536	Install angle valves	52
D787	Open clogged or restricted drains using power-operated augers	50
V1168	Inspect mobility bags or kits	50
K6471	Locate water pipe leaks	49
H380	Bend tubing by hand	48
J541	Install faucets	48
I428	Adjust water flow of water fountains	48
H370	Assemble or disassemble plastic tubing	47
H376	Assemble plastic pipe using threaded joints	47
J542	Install flushometer valves	46
O790	Open clogged or restricted sewers using high-pressure water equipment	45
O786	Open clogged or restricted drains using hand-operated augers	45
V1209	Tear down, inspect, clean, and reassemble weapons, such as M-16 rifles	45

TABLE 17

EQUIPMENT TOOLS AND SUPPORT EQUIPMENT USED BY MORE THAN 30 PERCENT OF FIRST-JOB OR FIRST-ENLISTMENT AFSC 3E4X1 PERSONNEL

EQUIPMENT	3E4X1 1ST JOB (N=236)	3E4X1 1ST ENL (N=452)
Acetylene Torches	40	46
Air Relief	29	34
Angle	57	59
Backflow Prevention	66	67
Backhoes	31	31
Ball	83	82
Basin Wrenches	64	68
Bench Grinders	51	50
Bench Threaders	60	63
Blow Bags	45	50
Blow Torches	31	31
Booster	33	35
Butterfly	49	52
Cargo Trucks	30	31
Centrifugal	52	54
Chain Cutters	45	51
Chain Hoists	28	31
Check	81	82
Compactor, pH	30	30
Diaphragm	50	50
Electric Drills	72	74
Electric Metal Pipe Locators	38	38
Flaring Tools	69	68
Flow Meter	33	34
Force Cup	65	66
Gas Masks	44	46
Gas Operated Saws	28	31
Gate	85	87
Geared Pipe Threaders	53	52
General Purpose Vehicles	72	74
Globe	71	72
Hand Drain Augers	61	65
Hand Sewer Augers	48	53
Hydrant Wrenches	63	66

TABLE 17 (CONTINUED)

EQUIPMENT TOOLS AND SUPPORT EQUIPMENT USED BY MORE THAN 30 PERCENT OF FIRST-JOB OR FIRST-ENLISTMENT AFSC 3E4X1 PERSONNEL

EQUIPMENT	3E4X1 1ST JOB (N=236)	3E4X1 1ST ENL (N=452)
K-12 Saw	47	51
Level	60	60
Nohub Wrenches	38	38
Nonsparking Tools	33	35
Outside Screw and Yoke (OS &Y)	43	41
Pipe Threaders, Electric	71	72
Pipe Threaders, Hand-Operated	67	61
Pipe Vises	61	64
Pipe Wrenches	80	81
Pitot Tubes	31	27
Plug	48	50
Plumb Bob	45	42
Portable Air Compressors	31	86
Portable Power Generators	33	36
Portable Threaders	36	39
Post Indicator	34	38
Pound Per Square Inch Gauges	28	30
Power Drain Augers	53	56
Power Sewer Augers	56	59
Pressure Regulating	29	30
Pressure Relief	54	60
Probing Rods	32	31
Propane Torches	58	64
Seat Wrenches	34	40
Shovels	82	84
Sledge Hammers	65	67
Snap Cutters	58	60
Stationary Threaders	40	38
Strap Wrenches	46	50
Sump	56	58
Tubing Cutters	70	71
Vacuum Plungers	58	59
Valve Reseating Kits	31	30
Water Buffaloes, Trailer-Mounted Water Tanks	36	39
Water Pressure Sewer Trucks	40	41

paragraphs 8 through 30 were thoroughly reviewed against OSR data. Typically, STS areas having matched tasks that have sufficiently high TE and TD ratings, and are performed by at least 20 percent of personnel in appropriate experience or skill-level groups (such as first-enlistment (1-48 months TAFMS) and 5- and 7-skill level groups), should be retained in the STS. On the other hand, STS areas having tasks with less than 20 percent performing across all of these groups should be considered for deletion.

Using this standard approach, a substantial portion of STS paragraphs did not have matched tasks with at least 20 percent members performing when compared to the total population criterion groups mentioned above. This lack of support across so many elements is no doubt due to the high degree of diversity among the jobs or functions performed within the career ladder. However, since the STS is intended to provide comprehensive coverage of tasks performed by career ladder personnel across all jobs or functions, it is critical that job-specific tasks be included in the STS.

This diversity and variety of jobs within the AFSC 3E4X1 career ladder therefore warrant a different approach, or perspective, in examining the STS to ensure that all major jobs are adequately covered on the STS. Thus, a second printout was created showing the clusters and job groups identified and corresponding percent members performing data for tasks matched to each STS paragraph. By using this method, 36 entries in the STS were not supported by OSR data. Examples of these entries are listed in Table 18. A complete listing of the STS paragraphs, with OSR data displayed for each of these jobs identified, can be found in the TRAINING EXTRACT report that accompanies this OSR. Training personnel and SMEs should review these areas closely to determine if continued inclusion in future revisions to the STS is warranted.

Tasks not matched to any element of the STS are listed at the end of the STS computer listing. One hundred sixty-seven technical tasks performed by more than 20 percent of criterion group members were not matched to the STS. The functional community and training personnel need to review these technical tasks for inclusion in the STS. They involve water treatment systems, sanitary waste and sewer systems, water distribution systems, plumbing fixtures and equipment, field water treatment equipment, and valves (see Table 19).

JOB SATISFACTION ANALYSIS

An examination of responses to the job satisfaction questions can give career ladder managers a better understanding of some of the factors that may affect the job performance of airmen in the career ladder. The survey booklet included questions covering job interest, perceived utilization of talents and training, sense of accomplishment from work, and reenlistment intentions. The responses of the current survey sample were then analyzed by making several comparisons: (1) among TAFMS groups of the Utilities career ladder and a comparative sample of personnel from other Support career ladders surveyed in 1994 (AFSCs

TABLE 18

EXAMPLES OF STS ITEMS NOT SUPPORTED BY OSR DATA (PERCENT MEMBERS PERFORMING)

STS REFERENCE/TASKS	3-LVL CRSE PROF CODE	PERCENT MEMBERS PERFORMING				
		FIRE SUPPRESSION (N=12)	PLUMBING INSTALLATION (N=10)	PLUMBING (N=639)	SWIMMING POOL MAINT (N=70)	WASTE-WATER SYS OPS (N=67)
8.13.05. Perform automated data analysis	3c					
E180 Update systems historical records		8	0	4	0	4
13.01 Use building construction plans to identify:						
13.01.02. Materials needed	1a					
E159 Prepare cost-estimates for in-service work requests		0	0	3	0	0
16.02.05 Grease traps	a					
0782 Install sanitary waste grease traps		0	0	9	1	6
29.02.04 Sanitary land fill:	A					
29.02 04.02 Establishment						
V1149 Construct field utility systems		0	10	15	4	4

TABLE 18 (CONTINUED)

EXAMPLES OF STS ITEMS NOT SUPPORTED BY OSR DATA
(PERCENT MEMBERS PERFORMING)

STS REFERENCE/TASKS	3-LVL CRSE PROF CODE	PERCENT MEMBERS PERFORMING				
		SUPERVISION (N=116)	FIELD WATER PURIFICATION PLANT OPS (N=11)	WATER SYSTEMS OPS (N=5)	HAZARDOUS WASTE (N=7)	TRAINING (N=7)
8.13.05. Perform automated data analysis	3c					
E180 Update systems historical records		9	18	0	0	0
13.01 Use building construction plans to identify:						
13.01.02. Materials needed	1a					
E159 Prepare cost-estimates for in-service work requests		15	0	0	0	0
16.02.05 Grease traps	a					
0782 Install sanitary waste grease traps		3	0	0	0	0
29.02.04 Sanitary land fill:	A					
29.02 04.01 Establishment						
V1149 Construct field utility systems		8	9	0	0	0

TABLE 19

EXAMPLES OF TECHNICAL TASKS PERFORMED BY 20 PERCENT OR MORE 3E4X1 JOB GROUP MEMBERS BUT NOT REFERENCED BY STS (PERCENT MEMBERS PERFORMING)

		FIRE SUPPRESSION (STG229)	PLUMBING INSTALLATION (STG282)	PLUMBING (STG116)	SWIMMING POOL MAINT (STG113)	WASTE-WATER SYS OPS (STG251)
G221	Clean gas chlorinators	8	0	15	49	58
G240	Flush pipe	50	20	50	36	33
H377	Assemble slip-joint connections	8	40	56	11	24
H409	Lower pipe into trenches manually	0	90	56	20	22
J536	Install angle valves	42	30	73	23	19
J537	Install ball valves	67	30	73	40	57
K623	Disinfect water tanks	0	0	18	31	40
K644	Install water meters	0	0	21	23	31
L673	Inspect water storage tanks	17	0	15	29	43
O790	Open clogged or restricted sewers using high-pressure water equipment	0	20	63	33	33
U1107	Operate Harvest Bare, Harvest Falcon, or Harvest Eagle field latrines	17	20	16	7	19
V1158	Erect hardback tents	33	20	46	27	33

TABLE 19 (CONTINUED)

EXAMPLES OF TECHNICAL TASKS PERFORMED BY 20 PERCENT OR MORE 3E4X1 JOB GROUP MEMBERS BUT NOT REFERENCED BY STS (PERCENT MEMBERS PERFORMING)

		SUPERVISION (STG118)	FIELD WATER PURIFICATION PLANT OPS (STG375)	WATER SYSTEMS OPS (STG261)	HAZARDOUS WASTE (STG294)	TRAINING (STG383)
G221	Clean gas chlorinators	25	0	60	0	0
G240	Flush pipe	22	0	20	0	0
H377	Assemble slip-joint connections	16	0	0	0	0
H409	Lower pipe into trenches manually	13	9	0	0	0
J536	Install angle valves	10	27	0	0	0
J537	Install ball valves	21	64	0	0	0
K623	Disinfect water tanks	20	9	40	0	0
K644	Install water meters	16	9	40	0	0
L673	Inspect water storage tanks	28	18	80	0	0
O790	Open clogged or restricted sewers using high-pressure water equipment	20	0	40	0	0
U1107	Operate Harvest Bare, Harvest Falcon, or Harvest Eagle field latrines	8	82	0	14	0
V1158	Erect hardback tents	28	18	0	14	14

3A0X1, 3C2X1, 3E0X2, 3E7X1, 3E8X1, 3M0X1, and 3R0X1); (2) between current and previous survey experience groups; and (3) across specialty groups identified in the SPECIALTY JOBS section of the report.

Table 20 compares first-enlistment (1-48 months TAFMS), second-enlistment (49-96 months TAFMS), and career (97+ months TAFMS) group data to corresponding enlistment groups from other Support AFSCs surveyed during the previous calendar year. These data give a relative measure of how the job satisfaction of AFSC 3E4X1 personnel compares with similar Air Force specialties. Overall, satisfaction for all three TAFMS groups in AFSC 3E4X1 is fairly high with no serious satisfaction problems noted except for the Perceived Use of Training in the 1-48 month TAFMS group where data was much lower than the comparative sample.

Comparison of job satisfaction indicator responses of the current survey TAFMS groups to TAFMS groups in the AFSC 552X2 1987 and AFSC 566X1 1985 surveys (see Table 21) indicate that generally, the 1995 responses are lower than the 1987 and 1985 responses.

An examination of job satisfaction data can also reveal the influences performing certain jobs may have on overall job satisfaction. Table 22 presents job satisfaction data for the jobs identified in the career ladder structure for AFSC 3E4X1. Overall, personnel in the Field Water Purification Plant Operations job had the lowest job satisfaction.

IMPLICATIONS

As explained in the **INTRODUCTION,** this survey was conducted primarily to provide training personnel with current information on the Utilities System career ladder for use in reviewing current training programs and training documents. Overall job progression is normal and shows a distinct pattern as one moves from the 3-skill level to the 7-skill level. AFMAN 36-2108 *Specialty Description* broadly describes the jobs and tasks being performed. Job satisfaction is fairly high, and no serious problem areas were noted. Analyses of career ladder documents indicate the STS is supported by survey data.

TABLE 20

JOB SATISFACTION INDICATORS FOR AFSC 3E4X1 TAFMS GROUPS (PERCENT MEMBERS RESPONDING)

	1-48 MONTHS TAFMS		49-96 MONTHS TAFMS		97+ MONTHS TAFMS	
	AFSC 3E4X1 (N=452)	COMP SAMPLE (N=4,321)	AFSC 3E4X1 (N=281)	COMP SAMPLE (N=2,878)	AFSC 3E4X1 (N=457)	COMP SAMPLE (N=5,557)
EXPRESSED JOB INTEREST:						
INTERESTING	64	69	65	67	69	74
SO-SO	25	18	23	20	22	15
DULL	11	13	12	13	9	10
PERCEIVED USE OF TALENTS:						
FAIRLY WELL TO PERFECT	78	75	88	76	81	81
NONE TO VERY LITTLE	22	25	12	24	18	19
PERCEIVED USE OF TRAINING:						
FAIRLY WELL TO PERFECT	54	82	82	78	70	78
NONE TO VERY LITTLE	46	17	18	22	29	22
SENSE OF ACCOMPLISHMENT FROM JOB:						
SATISFIED	77	67	76	69	70	71
NEUTRAL	8	15	0	12	12	9
DISSATISFIED	15	17	24	19	16	19
REENLISTMENT INTENTIONS:						
YES OR PROBABLY YES	53	59	76	73	67	71
NO OR PROBABLY NO	47	40	24	27	12	10
WILL RETIRE	0	0	0	0	18	19

NOTE: Columns may not add to 100 percent due to rounding or nonresponse
Comparative data are from AFSCs 3A0X1, 3C2X1, 3E0X2, 3E7X1, 3E8X1, 3M0X1, and 3R0X1 surveyed in 1994

TABLE 21

COMPARISON OF JOB SATISFACTION INDICATORS FOR AFSC 3E4X1 TAFMS GROUPS IN CURRENT STUDY TO PREVIOUS STUDY (PERCENT MEMBERS RESPONDING)

	1-48 MONTHS TAFMS			49-96 MONTHS TAFMS			97+ MONTHS TAFMS		
	1995 3E4X1 N=452	1987 552X5 N=660	1985 566X1 N=409	1995 3E4X1 N=281	1987 552X5 N=226	1985 566X1 N=162	1995 3E4X1 N=62	1987 552X5 N=354	1985 566X1 N=213
EXPRESSED JOB INTEREST:									
INTERESTING	64	75	79	65	79	76	69	82	78
SO-SO	25	16	9	23	15	13	22	11	12
DULL	11	8	11	12	6	8	9	5	7
PERCEIVED USE OF TALENTS:									
FAIRLY WELL TO PERFECT	78	83	82	78	84	82	81	83	83
NONE TO VERY LITTLE	22	16	18	22	15	17	18	16	16
PERCEIVED USE OF TRAINING:									
FAIRLY WELL TO PERFECT	81	88	79	73	67	76	70	83	87
NONE TO VERY LITTLE	18	12	21	27	32	23	29	16	12
SENSE OF ACCOMPLISHMENT FROM JOB:									
SATISFIED	76	78	58	70	77	53	70	78	75
NEUTRAL	12	11	20	11	10	26	12	11	14
DISSATISFIED	11	10	20	19	11	18	16	11	9
REENLISTMENT INTENTIONS:									
YES OR PROBABLY YES	56	56	57	70	72	76	67	74	77
NO OR PROBABLY NO	42	42	40	29	26	23	12	8	7
WILL RETIRE	0	*	0	0	1	1	18	17	15

* Less than 1 percent

NOTE: Columns may not add to 100 percent due to rounding or nonresponse

TABLE 22

JOB SATISFACTION INDICATORS FOR AFSC 3E4X1 JOB GROUPS (PERCENT MEMBERS RESPONDING)

	FIRE SUPPRESSION (STG229)	PLUMBING INSTALLATION (STG282)	PLUMBING (STG116)	SWIMMING POOL MAINT (STG113)	WASTE-WATER SYS OPS (STG251)
EXPRESSED JOB INTEREST:					
INTERESTING	67	60	66	60	73
SO-SO	17	30	25	23	18
DULL	16	10	9	17	9
OTHER	0	0	0	0	0
PERCEIVED USE OF TALENTS:					
FAIRLY WELL TO PERFECT	75	80	82	73	86
NONE TO VERY LITTLE	25	20	17	27	13
PERCEIVED USE OF TRAINING:					
FAIRLY WELL TO PERFECT	58	60	79	70	91
NONE TO VERY LITTLE	42	40	21	30	9
SENSE OF ACCOMPLISHMENT FROM JOB:					
SATISFIED	58	80	76	57	79
NEUTRAL	8	10	11	16	9
DISSATISFIED	25	10	12	27	9
OTHER	8	0	1	0	3
REENLISTMENT INTENTIONS:					
YES OR PROBABLY YES	59	40	65	61	66
NO OR PROBABLY NO	33	50	28	36	32
WILL RETIRE	8	10	5	0	1
NO RESPONSE	0	0	1	3	0

NOTE: Columns may not add to 100 percent due to rounding or nonresponse

TABLE 22 (CONTINUED)

JOB SATISFACTION INDICATORS FOR AFSC 3E4X1 JOB GROUPS
(PERCENT MEMBERS RESPONDING)

	SUPERVISION (STG118)	FIELD WATER PURIFICATION PLANT OPS (STG375)	WATER SYSTEMS OPS (STG261)	HAZARDOUS WASTE (STG294)	TRAINING (STG383)
EXPRESSED JOB INTEREST:					
INTERESTING	77	36	40	100	86
SO-SO	19	18	20	0	0
DULL	4	45	40	0	0
OTHER	0	0	0	0	14
PERCEIVED USE OF TALENTS:					
FAIRLY WELL TO PERFECT	88	73	40	85	100
NONE TO VERY LITTLE	12	27	60	14	0
PERCEIVED USE OF TRAINING:					
FAIRLY WELL TO PERFECT	77	27	60	57	57
NONE TO VERY LITTLE	22	73	40	43	43
SENSE OF ACCOMPLISHMENT FROM JOB:					
SATISFIED	71	36	60	86	100
NEUTRAL	9	0	0	14	0
DISSATISFIED	19	64	40	0	0
OTHER	1	0	0	0	0
REENLISTMENT INTENTIONS:					
YES OR PROBABLY YES	63	45	60	43	86
NO OR PROBABLY NO	17	54	40	57	0
WILL RETIRE	18	0	0	0	14
NO RESPONSE	2	0	0	0	0

NOTE: Columns may not add to 100 percent due to rounding or nonresponse

APPENDIX A

REPRESENTATIVE TASKS PERFORMED BY MEMBERS OF CAREER LADDER JOBS

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TABLE A1

FIRE SUPPRESSION
(STG229, N=12)

TYPICAL TASKS		PERCENT
R1023	Troubleshoot pressure fluctuations in fire suppression systems	100
R1007	Replace wet-pipe fire suppression system components	100
R981	Inspect foam fire suppression systems	100
R1022	Troubleshoot malfunctions to defective water gong alarms	100
R967	Clean fire suppression systems valve enclosures	100
R982	Inspect preaction fire suppression systems	100
R1013	Reset preaction fire suppression systems	100
R977	Inspect dry-pipe fire suppression systems	92
R983	Inspect wet-pipe fire suppression systems	92
R997	Perform residual pressure tests on valves of wet-pipe fire suppression systems	92
R1005	Replace foam fire suppression system components	92
R969	Clean inside components of wet-pipe fire suppression systems	92
R975	Inspect deluge fire suppression systems	92
R1006	Replace foam fire suppression system components	92
R1012	Reset foam fire suppression systems	92
R974	Identify and mark fire suppression systems piping	92
R1008	Reset deluge fire suppression systems	92
R977	Inspect dry-pipe fire suppression systems	84
R1018	Test interior fire suppression systems for alarm operation	84
R979	Inspect fire suppression tanks	84
R1021	Troubleshoot malfunctions to defective test valves	84
R1000	Replace deluge fire suppression system components	84
R1020	Troubleshoot malfunctions to defective retard chambers	84
R976	Inspect dry-chemical fire suppression systems	84

TABLE A2

PLUMBING INSTALLATION
(STG282, N=10)

TYPICAL TASKS		PERCENT
H413	Measure pipe	100
H400	Cut plastic pipe or tubing	100
H374	Assemble plastic pipe using solvent weld joints	100
H369	Assemble or disassemble plastic pipe fittings	100
H415	Ream piping or tubing	100
H426	Thread pipe using mounted power threaders	100
H425	Thread pipe using hand threaders	100
H379	Backfill trenches	90
H409	Lower pipe into trenches manually	90
G270	Maintain handtools	80
H371	Assemble or disassemble threaded pipe fittings	80
H365	Assemble galvanized, black iron, or steel pipe	80
V1168	Inspect mobility bags or kits	80
H388	Cut copper pipe or tubing	80
H401	Finish grade trenches by hand shovel	70
V1167	Fire weapons for qualification or proficiency	70
G224	Clean pipe threading machines	60
H404	Guide lowering of pipe into trenches	60
H378	Attach pipe to building structures	60
J544	Install gate valves	60
J559	Install valve boxes	60
H362	Assemble copper tubing using silver solder	50
H376	Assemble plastic pipe using threaded joints	50
H403	Guide backfill of trenches	50
H352	Apply corrosion preventive wrappings to pipe	50
V1153	Don or doff chemical warfare personal protective clothing	50

TABLE A3

PLUMBING CLUSTER
(STG116, N=639)

TYPICAL TASKS		PERCENT
H369	Assemble or disassemble plastic pipe fittings	89
H388	Cut copper pipe or tubing	88
H365	Assemble galvanized, black iron, or steel pipe	87
H400	Cut plastic pipe or tubing	87
H371	Assemble or disassemble threaded pipe fittings	86
J544	Install gate valves	85
H390	Cut galvanized, black iron, or steel pipe	84
G270	Maintain handtools	84
H413	Measure pipe	83
H363	Assemble copper tubing using sweat solder	82
H415	Ream piping or tubing	81
H374	Assemble plastic pipe using solvent weld joints	79
H360	Assemble copper tubing using ferruled fittings	78
H359	Assemble copper tubing using compression couplings	77
H426	Thread pipe using mounted power threaders	76
H425	Thread pipe using hand threaders	75
H361	Assemble copper tubing using flared fittings	74
H380	Bend tubing by hand	74
J537	Install ball valves	73
D787	Open clogged or restricted drains using power-operated augers	73
J580	Remove gate valves	73
K647	Locate water pipe leaks	72
V1167	Fire weapons for qualification or proficiency	72
G224	Clean pipe threading machines	72
J541	Install faucets	69
I428	Adjust water flow of water fountains	68
J539	Install check valves	68
H419	Replace traps	68
G308	Replace dies on pipe threading machines	68

TABLE A4

SWIMMING POOL MAINTENANCE CLUSTER
(STG113, N=70)

TYPICAL TASKS		PERCENT
M710	Adjust pH in pools	92
M711	Backwash pool filters	91
M714	Clean pool hair catchers	90
M721	Maintain chlorine level in pools	87
G205	Add chemicals to chemical feeders	86
M716	Collect pool water samples	86
M719	Fill pools	81
G207	Adjust chemical feeders	80
M718	Drain pools	80
N755	Perform pH tests of water samples	77
G260	Install chlorine cylinders	77
G294	Remove chlorine cylinders	73
N740	Perform chlorine residual tests of water samples	70
M727	Super-chlorinate cylinders	67
G270	Maintain handtools	66
G217	Clean chemical feeders	66
M717	Direct water flow through filters	63
M724	Recirculate pools	60
V1167	Fire weapons for qualification or proficiency	60
O771	Check operations of sewer lift pumps	59
M713	Clean pool drains	57
J544	Install gate valves	56
M715	Clean pools	54
H369	Assemble or disassemble plastic pipe fittings	54
V1168	Inspect mobility bags or kits	53
G307	Replace chlorinator components	53
H400	Cut plastic pipe or tubing	52
L691	Operate water wells	49
M730	Winterize pools	49
G221	Clean gas chlorinators	49
J539	Install check valves	49

TABLE A5

WASTEWATER SYSTEMS OPERATIONS
(STG251, N=67)

TYPICAL TASKS		PERCENT
Q946	Perform pH tests of wastewater samples	99
O771	Check operations of sewer lift pumps	90
Q923	Check wastewater sample temperatures	90
P874	Operate digesters	90
Q950	Perform settable solid tests of wastewater samples	85
Q937	Perform dissolved oxygen (DO) tests of wastewater samples	85
G301	Repack pumps	85
G294	Remove chlorine cylinders	82
P883	Operate lift stations, other than temporary	81
Q926	Clean wastewater treatment testing equipment	81
O779	Inspect sanitary lift station equipment	81
G207	Adjust chemical feeders	81
G260	Install chlorine cylinders	81
P855	Inspect sludge pumps	81
G348	Unclog pumps	81
P898	Rake bar screens	80
G205	Add chemicals to chemical feeders	80
N755	Perform pH tests of water samples	80
G270	Maintain handtools	80
P864	Inspect wastewater treatment equipment for corrosion	78
G326	Replace sump pumps	78
Q928	Collect wastewater samples for local analyses	76
P899	Recirculate wastewater	76
P892	Operate sludge pumps	75
N740	Perform chlorine residual tests of water samples	75
P840	Inspect digesters	75
Q934	Perform chlorine residual tests of wastewater samples	73
Q931	Perform biochemical oxygen demand (BOD) tests of wastewater samples	73
H369	Assemble or disassemble plastic pipe fittings	73
H400	Cut plastic pipe or tubing	73

TABLE A6

SUPERVISION
(STG118, N=116)

TYPICAL TASKS		PERCENT
C113	Write EPRs	93
A23	Establish work priorities	88
A1	Assign personnel to work areas or duty positions	88
B39	Counsel personnel on personal or military-related matters	87
A33	Schedule personnel for leaves, passes, or temporary duties (TDYs)	86
A7	Coordinate work activities with other civil engineering (CE) shops	86
C106	Inspect personnel for compliance with military standards	85
A9	Determine logistics requirements, such as equipment, personnel, or space	84
A29	Plan or schedule work assignments	84
C94	Evaluate personnel for compliance with performance standards	83
A24	Establish work schedules	80
C115	Write recommendations for awards or decorations	80
B79	Supervise Utilities System Journeymen (AFSC 3E451)	80
A20	Establish performance standards for subordinates	80
A30	Plan or schedule work priorities	79
A8	Coordinate work requirements with CE superintendents	78
B38	Conduct supervisory orientations of newly assigned personnel	78
A2	Assign sponsors for newly assigned personnel	76
B73	Interpret policies, directives, or procedures for subordinates	72
C95	Evaluate personnel for promotion, demotion, reclassification, or special awards	72
B78	Supervise Utilities System Apprentices (AFSC 3E431)	72
D122	Counsel trainee on training progress	69
D130	Evaluate personnel for training needs	68
D118	Assign on-the-job training (OJT) trainers	66
B76	Supervise civilian personnel	66
D131	Evaluate progress of trainees	66
D119	Conduct OJT	65

TABLE A7

FIELD WATER PURIFICATION PLANT OPERATIONS
(STG375, N=11)

TYPICAL TASKS		PERCENT
E179	Update maintenance data records	100
U1093	Disassemble Harvest Bare, Harvest Falcon, or Harvest Eagle field latrines	100
U1134	Set up Harvest bare, Harvest Falcon, or Harvest Eagle field shower units	100
U1135	Set up reverse osmosis water purification units	100
U1111	Operate reverse osmosis units	100
U1092	Disassemble Harvest Bare, Harvest Falcon, or Harvest Eagle field latrines	91
U1108	Operate Harvest Bare, Harvest, Falcon, or Harvest Eagle field shower units	91
U1099	Install components of reverse osmosis units	91
U1137	Tear down reverse osmosis water purification units	91
V1162	Erect temper tents	91
U1133	Set up Harvest Bare, Harvest Falcon, or Harvest Eagle field latrines	91
U1129	Replace reverse osmosis unit membranes	91
U1124	Replace components of reverse osmosis units, other than unit membranes	91
V1182	Operate forklifts	91
U1107	Operate Harvest Bare, Harvest Falcon, or Harvest Eagle field latrines	82
V1192	Palletize contingency equipment	82
V1167	Fire weapons for qualification or proficiency	82
E173	Review manuals or TOs for guidance in maintaining tools or equipment	73
V1169	Inspect packed or palletized mobility or contingency equipment prior to transport	73
V1161	Erect portable latrines	73
H374	Assemble plastic pipe using solvent weld joints	73
U1094	Disinfect water under field conditions	73
J527	Inspect gate valves	73
E151	Inventory equipment, supplies, or tools	64
V1185	Operate M-series vehicles during contingency exercises or operations	64
V1190	Pack contingency equipment	64
A20	Establish performance standards for subordinates	64
C88	Evaluate capabilities of equipment	64
V1160	Erect portable latrines	64
V1168	Inspect mobility bags or kits	64
H371	Assemble or disassemble threaded pipe fittings	64

TABLE A8

WATER SYSTEMS OPERATIONS
(STG261, N=5)

TYPICAL TASKS		PERCENT
L691	Operate water wells	100
L692	Operate well pumps	100
L686	Operate fluoridators	100
N755	Perform pH tests of water samples	100
N747	Perform fluoride tests of water samples	100
G260	Install chlorine cylinders	100
G294	Remove chlorine cylinders	100
N732	Clean water treatment testing equipment	100
J525	Inspect check valves	100
J527	Inspect gate valves	100
L662	Aerate water	80
N740	Perform chlorine residual tests of water samples	80
G205	Add chemicals to chemical feeders	80
N734	Collect water samples for local analyses	80
G207	Adjust chemical feeders	80
L673	Inspect water storage tanks	80
K622	Disinfect water lines	80
L677	Inspect water treatment system chlorine storage and feeder equipment	80
V1167	Fire weapons for qualification or proficiency	80
G301	Repack pumps	80
G350	Visually inspect electric motors	80
L676	Inspect water treatment equipment for corrosion	80
G249	Inspect piping for corrosion	60
N739	Perform chloride tests of water samples	60
L701	Replace fluoridator components	60
G255	Inspect water or wastewater system buildings or structures	60
G289	Read installed meters or recording devices	60
L706	Replace well pipe or pumps	60
G270	Maintain handtools	60
G217	Clean chemical feeders	60

TABLE A9

HAZARDOUS WASTE
(STG294, N=7)

TYPICAL TASKS		PERCENT
F197	Maintain hazardous waste documentation records or log books	100
F195	Inspect stored hazardous waste materials	100
F193	Inspect markings or decals on waste or acid drums	100
F188	Dispose of hazardous waste materials, other than asbestos	100
F202	Store hazardous waste materials	68
F190	Inspect condition of respirator harness	86
F186	Contain hazardous waste spills	86
F189	Inspect condition and cleanliness of protective clothing	72
F198	Maintain hazardous waste spill kits	72
F194	Inspect permanently-installed emergency eyewashes	72
F203	Store respirators	72
F187	Dispose of contaminated protective clothing	72
F185	Change respirator filters	72
B36	Compile data for reports or staff meetings	57
F192	Inspect emergency showers	57
F204	Transport hazardous waste materials	57
F201	Replace personal safety equipment components, such as respirators, face shields, or ear protectors	57
V1167	Fire weapons for qualification or proficiency	43
V1140	Assemble and tow AM-2 matting for rapid runway repairs	43
V1146	Construct fiberglass reinforced polyurethane (FRP) runway repairs	29
V1171	Lay AM-2 matting for aircraft parking revetments	29
B68	Implement safety or security programs	29
F196	Inspect user-maintained portable emergency eyewashers	29
A22	Establish work methods or controls	29
V1168	Inspect mobility bags or kits	29
E157	Post entries in daily or monthly logs	29
V1209	Tear down, inspect, clean, and reassemble weapons, such as M-16 rifles	29
V1158	Erect hardback tents	29
B58	Direct support for Prime Base Engineer Emergency Force (BEEF) operations	29

TABLE A10

TRAINING
(STG383, N=7)

TYPICAL TASKS		PERCENT
D122	Counsel trainees on training progress	100
D120	Conduct resident course classroom training	100
D131	Evaluate progress of trainees	100
D117	Administer or score tests	86
D132	Evaluate training methods and techniques	86
D137	Write test questions	72
D121	Conduct training conferences or briefings	57
D129	Evaluate effectiveness of training programs	57
D119	Conduct OJT	57
D136	Procure training aids, space, or equipment	43
D126	Develop performance tests	43
D134	Maintain training records, charts, or graphs	43
B68	Implement policies, directives, or procedures for subordinates	43
B37	Conduct general meetings, such as staff meetings or briefings	43
D138	Write training reports	29
D133	Maintain training records, charts, or graphs	29
B39	Counsel personnel on personal or military-related matters	29
B73	Interpret policies, directives, or procedures for subordinates	29
D118	Assign on-the-job training (OJT) trainers	29
C97	Evaluate safety or security programs	29
D130	Evaluate personnel for training needs	29
D123	Determine training requirements	29
D135	Plan or schedule training, such as OJT or ancillary training	14
C106	Inspect personnel for compliance with military standards	14
C94	Evaluate personnel for compliance with performance standards	14
B71	Implement work methods or controls	14
A34	Schedule staff meetings	14
A26	Plan briefings	14
D128	Establish study reference files	14